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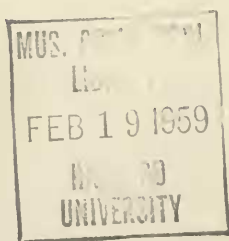
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A New Snake of the Genus *Geophis* From Chihuahua, Mexico

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JOHN M. LEGLER

In July, 1957, members of a field party from the University of Kansas Museum of Natural History, under the direction of Mr. Sydney Anderson, spent 12 days collecting vertebrates in the vicinity of Creel in southwestern Chihuahua. Among the specimens are two snakes representing an undescribed species of the genus *Geophis*. A description and illustrations of these two specimens were prepared and submitted for publication in the spring of 1958. At that time it came to my attention that Dr. Norman Hartweg, Museum of Zoology, University of Michigan, was also preparing a report on four specimens of the same species from two additional localities in southwestern Chihuahua. Upon learning of my work on the species, Dr. Hartweg generously loaned me his specimens and notes and allowed me to incorporate them in the present report. The snakes may be known and described as:

Geophis aquilonaris new species

Holotype.—Adult female, KU 44265, alcoholic; 23 mi. S and 1½ mi. E Creel, Chihuahua, Mexico; 23 July 1957; original number 198, Ronald H. Pine.

Paratypes.—(Total of five alcoholic specimens, all from Chihuahua) Male (probably subadult), KU 44266, same data as holotype; male, UMMZ 117770, Mojarachic, 23 July 1957, Irving W. Knobloch; females, UMMZ 111501-2, Maguarachic, August 1954, and UMMZ 117771, Maguarachic, August 1957, Irving W. Knobloch.

Diagnosis.—Size small; 15 rows of smooth scales; a high number of ventral (173 to 183) and subcaudal (55 to 64) scales; alternating dark and pale rings on body and tail; dark rings, and often pale rings, complete.

Description of Holotype.—Snout-vent length 327 mm.; length of tail 93 mm.; anal scale entire; ventral scales 181 + anal; subcaudal scales 63 + tip; dorsal scales in 15 rows on all parts of body; six supralabials (fifth and sixth fused on left side), third and fourth entering orbit; fifth supralabial largest and in broad contact with parietal, posterior temporal, and postocular; six infralabials on each side, first pair in contact behind mental; enlarged chin shields in two pairs, anterior pair longer than posterior pair; anterior chin shields in contact for half their length with fourth infralabials; rostral nearly as high as broad; internasal and prefrontal scales paired and distinct; anterior and posterior segments of nasals distinct and nearly equal in size; loreal twice as long as high, in contact with eye; preocular lacking (represented by minute scale on left side); vertical diameter of eye equal to distance from lower rim

of orbit to free edge of upper lip; temporal formula $0 + 1$, the single temporal scale separating sixth supralabial and parietal; one postocular and one supra-

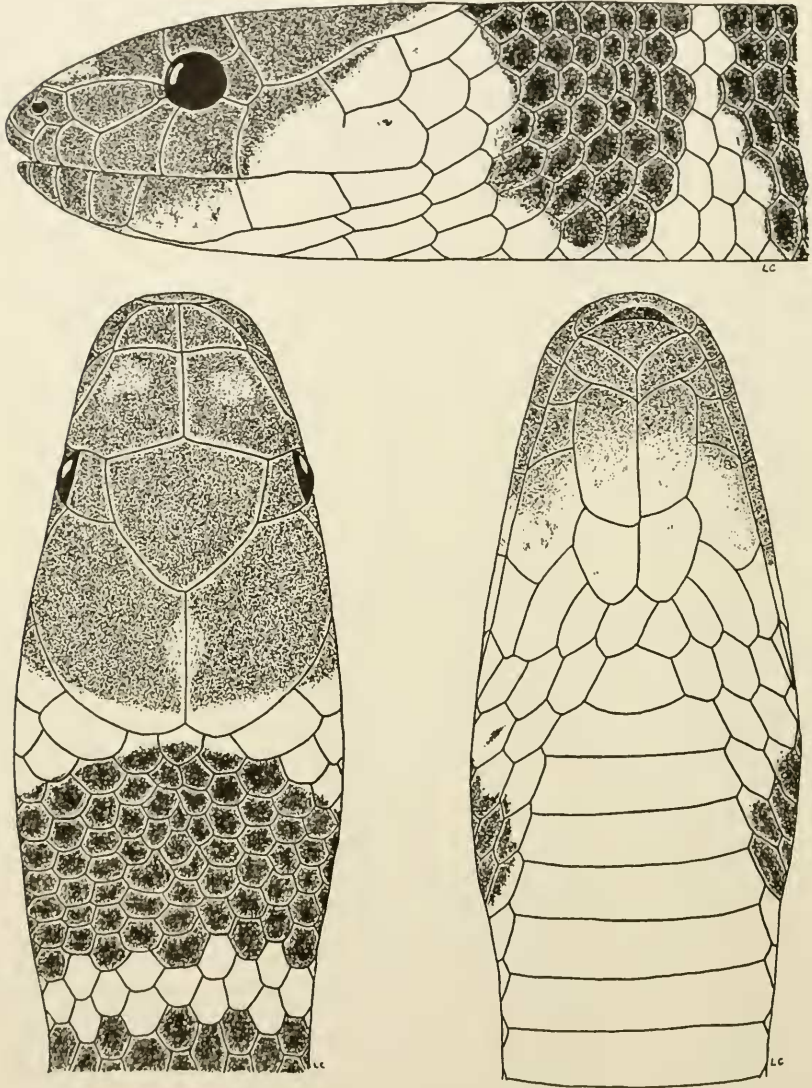


FIG. 1. *Geophis aquilonaris* new species, KU 44265, Holotype; lateral, dorsal, and ventral views of head and neck (approximately $\times 6$).

ocular on each side; all scales perfectly smooth; no scale-pits evident; dentary bone bearing eight teeth; maxillary bone bearing seven teeth; posterior tooth longest, thinnest, and separated from other teeth by slight diastema (maxillary

teeth in UMMZ 111502, 6/7, dentary teeth 8/8, no diastema in maxillary series).

Head slate-black above, having dim pale mark on anterior part of each prefrontal and another on interparietal seam; an indistinct pale gray crescent on posterior border of nostril; narrow cream band covering posterior edges of parietal and half of first dorsal scale row, widening laterally to include

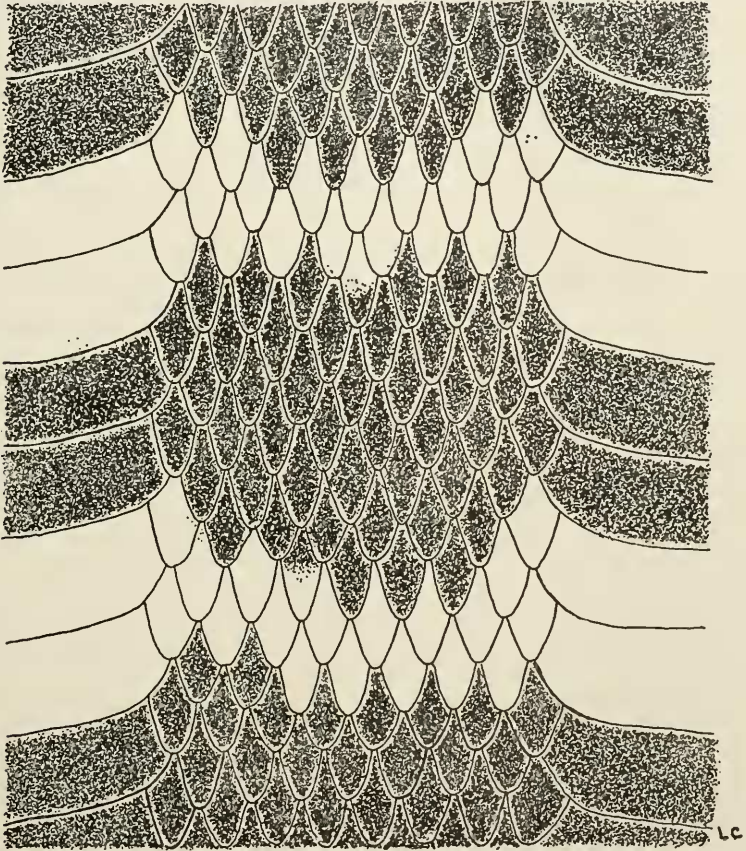


FIG. 2. *Geophis aquilonaris* new species, KU 44265, Holotype; scalation and coloration at mid-body showing 19th and 20th white rings (approximately $\times 7$).

temporal and posterior two or three supralabials; throat cream (except for dark markings on mental, on first three infralabials, and on anterior chin shields), its pale area continuous with pale band on head; body and tail marked with alternating white and black rings; white rings (excluding band on head) 38 on body, 17 on tail; each white ring alternately one and two scales wide dorsally (producing wavy or zigzag effect), widened laterally, and three to four scales wide on belly; black rings three to four and one half

scales wide on middorsal line, and two to three scales wide on belly; black and white rings (excepting first black ring behind head) continuous around body and tail. Colors described above nearly same as in living specimens.

Range.—The species is known only from three localities on the Pacific drainage of southwestern Chihuahua; the geographic range probably includes parts of southern Sonora and northern Sinaloa. The discovery of *Geophis* in southern Chihuahua increases to 21 the number of species of the genus known to occur in Mexico and extends the known range of the genus approximately 560 miles northwestward from the type locality of *G. latifrontalis*, a point 50 miles south (in Guanajuato?) of San Luis Potosí, or, a slightly lesser number of miles north-northwestward from an indefinite locality for *G. bicolor* in western Jalisco (La Cumbre de los Arrastrados) (Boulenger, Catalogue of the snakes in the British Museum, Vol. 2, 1894, p. 298).

Variation.—Standard counts of scales are given for the paratypes as well as the holotype in table 1. The fifth and sixth supralabial scales are fused on both sides of one specimen (UMMZ 117771) as is the case on the left side of the holotype. Except for one specimen (UMMZ 117770) that has a small anterior temporal separating the posterior two-thirds of the fifth supralabial from the parietal on each side, the temporal formula in the type series is uniformly 0 + 1.

TABLE 1.—COUNTS OF SCALES, MEASUREMENTS, AND OTHER DATA PERTAINING TO HOLOTYPE AND PARATYPES OF *Geophis aquilonaris* NEW SPECIES.

		Sex	Dorsal scale rows	Ventrals	Sub-caudals	Pale rings		Snout-vent length	Length of tail
						Body	Tail		
UMMZ	111501	♀	15	173	55	29	12	237	60
UMMZ	111502	♀	15	181	58	34	14	355	88
UMMZ	117771	♀	15	182	55	39	16	371	90
KU	44265	♀	15	183	63	38	17	327	93
KU	44266	♂	15	175	60	30	13	160	43
UMMZ	117770	♂	15	174	64	34	15	245	74

Considerably more variation occurs in color and in the arrangement of markings than in squamation. The ground color of the two specimens from Creel is black with little or no trace of brown, and the rings are white. Ground color in the remaining paratypes ranges from grayish black, with some brownishness on the belly, to dark brown, the colors in one specimen approximating the range from Mummy brown to Dresden brown, becoming paler posteriorly and ventrally. The head is slate gray to blackish brown in all the specimens. Those having a suggestion of brown on the head tend also to have more brown on the body.

The dark band on the neck is complete in four of the paratypes and in-

complete (as in holotype) in one. Pale marks on the prefrontals are lacking in three of the paratypes and the pale mark between the parietals is lacking in two specimens (fused with white band on neck of one specimen). Pale postnarial crescents are evident in three paratypes.

As stated above, the rings on the holotype are mostly complete. Exceptions occur between the 13th and 15th white rings where two black rings are fused on the left side, rendering one black and one white ring (the 14th) incomplete. Also, where the ninth and tenth white rings fuse on the left side, they enclose a black ring and render it incomplete. The markings of the three smaller paratypes are substantially the same as those of the holotype—complete rings with a small number of variations in each specimen. In the two largest paratypes nearly all the white rings are incomplete ventrally, appearing to have been encroached upon by the darker ground color. In the larger specimens there is a tendency also for the white rings to be one scale wide (rather than alternately one and two scales wide) and to lack a zigzag appearance; this appears to be due to the darkening of entire scales and to the darkening of the edges of other scales.

Relationships.—*Geophis aquilonaris* is distinct from all other Mexican representatives of the genus in having, on the body and tail, numerous, alternating pale and dark bands. Both sets of bands are in the form of complete rings or the dark bands are joined ventrally rendering the belly dark.

Of the seven other Mexican *Geophis* having 15 rows of scales, four species (*cancellatus*, *dugesii*, *chalybeus*, and *semidoliatus*) have alternating pale and dark transverse markings and therefore superficially resemble *aquilonaris*. Of the latter two species, the poorly known *G. chalybeus* (Veracruz) has a much lower (137 to 142) number of ventrals than *aquilonaris*, and *G. semidoliatus* (southeastern Mexico—Veracruz, Hidalgo, and Oaxaca) has a narrower head, fewer supralabials (four to five with only the third entering the orbit), and fewer ventrals (136 to 169) than *aquilonaris*. *Geophis aquilonaris* seems to be most closely allied to *G. cancellatus* (Chicharras, Chiapas) and *G. dugesii* (known from two localities in northern Michoacán); all three species resemble one another in the number and arrangement of the scales of the head, in general coloration, and in having relatively high numbers of ventral scales (171 in *cancellatus*, 150 to 164 in *dugesii*). *G. cancellatus* differs from the other two species in lacking internasal scales. *Geophis aquilonaris* differs from both species in having a higher number of ventral and subcaudal scales, a longer tail (tail contained in snout-vent length three to four times in *aquilonaris*, four and one half to six times in *dugesii*, 11 to 12 times in *cancellatus*), and in having more bands on the body (28 to 32 in *cancellatus*),

latus, two to seven in *dugesii*). The belly in *dugesii* and *cancellatus* is pale but in *aquilonaris* it is ringed or of a solid dark color.

As more specimens of *Geophis* become available from intermediate localities in Mexico, it will perhaps be demonstrated that many of the kinds now thought of as full species (including those discussed above) are subspecies of a few wide-ranging species.

Remarks.—The type locality of *G. aquilonaris* is the small village of Barranca at the bottom of the valley of the Río Urique, several miles south and west of the continental divide. The Urique Valley, known as the Barranca del Cobre in the region south of Creel, is a deep canyon, the walls of which slope abruptly from approximately 7300 to 3000 feet and are dissected by deep side-canyons. Coniferous forest on the upper rim of the canyon is replaced by scrub vegetation on the rocky walls and by an arid tropical flora on the bottom.

Maguarachic (elevation approximately 5400 feet, longitude and latitude respectively, 108 degrees, 03 minutes W and 27 degrees, 50 minutes N) and Mojarachic (elevation approximately 7000 feet, longitude and latitude respectively, 108 degrees W and 27 degrees, 52 minutes N) are situated approximately three miles from each other and approximately 27 miles northwest of Creel. Maguarachic is given as "Mafuarachic" on the American Geographical Society map (NG 12, Baja California-Mexico, Prov. Ed., 1924). Mojarachic is not on any map of Chihuahua that I have examined.

The type and topotypic paratype were given to a member of the K. U. field party by a Mexican youth who had obtained them the previous night on the lower rocky slopes of the canyon. Both specimens were damaged by the collector piercing their heads with thorns, presumably to kill them. The type contained three oviducal eggs, each about four millimeters long. The stomachs of both specimens from Creel contained earthworms.

The presence of *Geophis* in this area suggests that the distribution of the genus is more or less continuous, on the western slope of the Sierra Madre Occidental, from Jalisco to southern Sonora.

I am grateful to Mr. Sydney Anderson and Mr. Ronald Pine for permission to use their field notes, to Dr. Hobart M. Smith for his examination of the specimens from Creel, to Mrs. Lorna Cordonnier for the drawings of the type, to Dr. Norman Hartweg for permitting me to study materials in his care and upon which he was making an independent study, and to Mr. Thomas M. Uzzell for locality data pertaining to the UMMZ paratypes.

Transmitted November 10, 1958.

